SCIENTIFIC RESEARCH IN LABORATORY OF HYPERSONIC AND PLASMA TECHNOLOGIES

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The research laboratory of hypersonic and plasma technologies (HPT laboratory) is established in Moscow Institute of Physics and Technology with the view of fundamental and applied researches in prospective aerospace systems and their propulsion units, the laboratory carries also a professional training in the aerospace field. It is an item of the Program 'Five Top 100' by the Ministry of Education and Science of the Russian Federation. As partners of the laboratory there are some leading academic and applied-research institutes, enterprises of aerospace industry, and institutes of higher education.

The HPT laboratory has recently obtained new computational-experimental data in the following fields of its research:

- thermal gasdynamic processes at hypersonic flow around bodies of various shape;
- thermophysical properties and material durability under higher thermal load;
- hydro-gas-dynamic and plasma-chemical processes in high-enthalpy multiphase flows.

The research works of HPT laboratory within the international project HEXAFLY-INT (High Speed Experimental Fly Vehicles - International) demonstrate the resource of simulation technique for external and internal gasdynamic processes under the incoming hypersonic flow against a prototype plane. The comparison of results obtained by computations and experiments proves their acceptable accuracy to predict the aerogasdynamic features of hypersonic aircraft.

A current task of the HPT laboratory is computational-engineering development of some possible validation models of a hypersonic aircraft with its integrated propulsion unit so that to perform comparative trials at various hypersonic installations and wind tunnels, and as well to compare predictive computational research with experimental data.

A configuration of the modelling hypersonic stand is presented for both educational laboratory works and scientific research over a wide range of Mach number.